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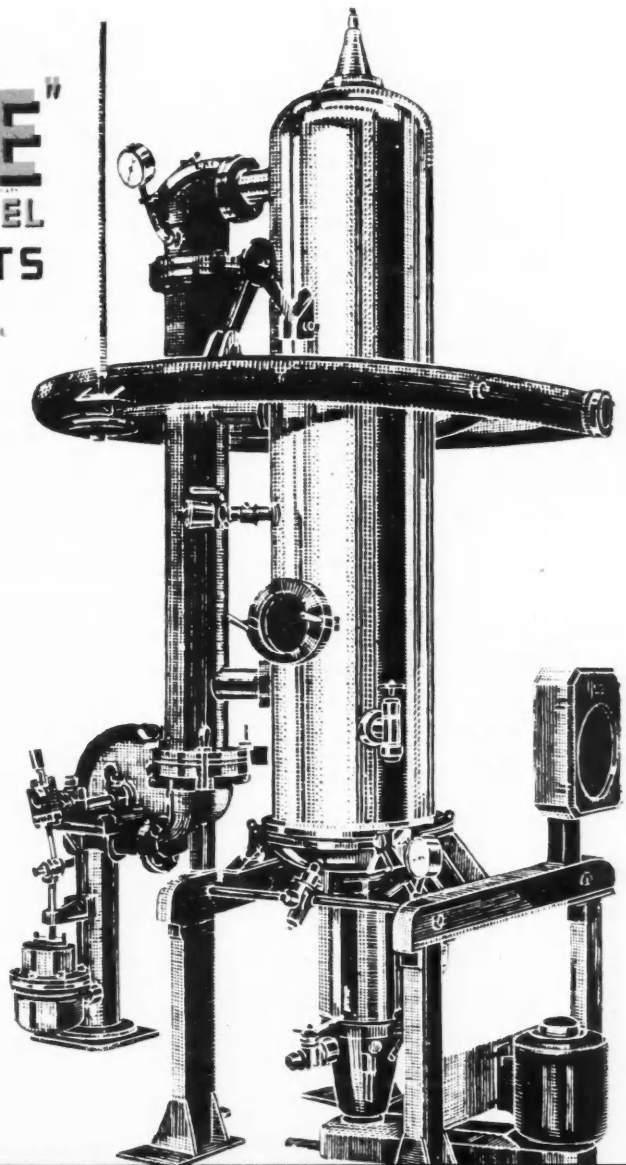

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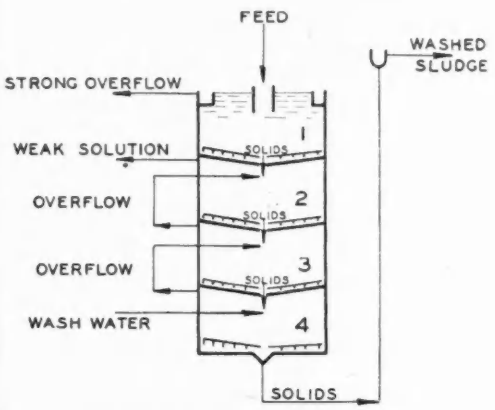

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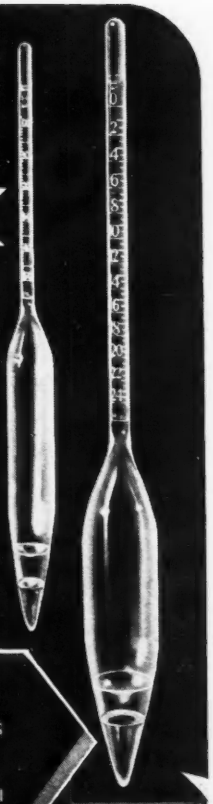

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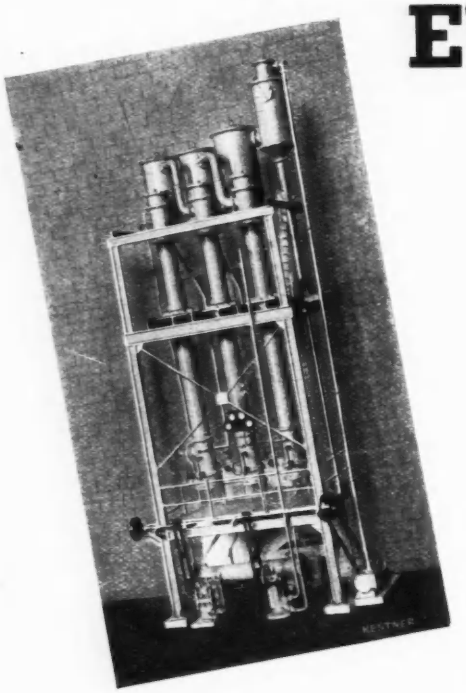

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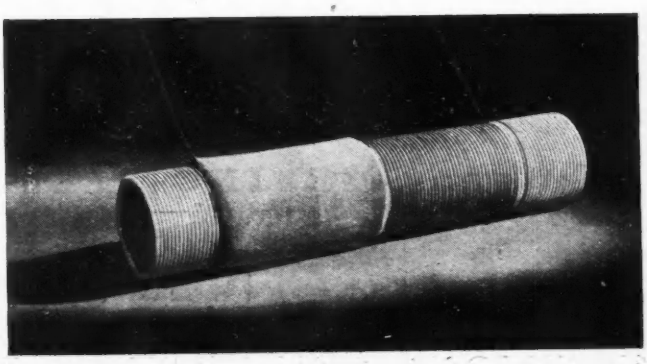

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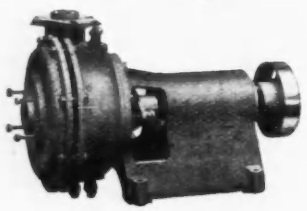

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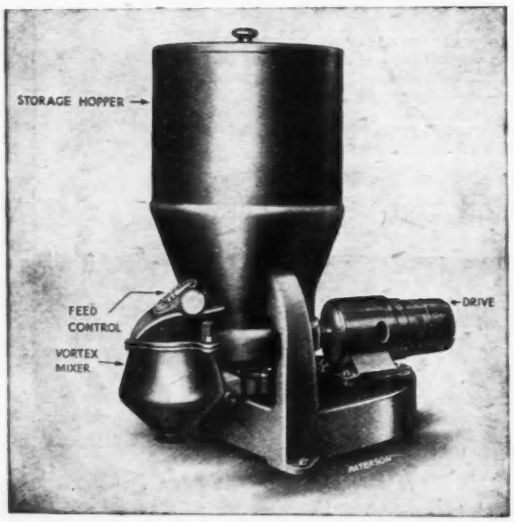

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The Industrial View of Education

THE growth of mechanisation has fortunately coincided with the general advance of education. Some eighty per cent. of the population are within the wage or salary limits of those whose children attend free schools. They are at once the primary producers and consumers of industrial products. Thus industry is provided at once with workers having the necessary mental equipment to handle new plant, and with the desire for a higher standard of living. Greater education will lead to a desire for still better living conditions, and this in turn will entail a demand for more industrial products.

Education is thus a subject of much greater importance to industry than it would appear to be at first sight. Many educationalists are demanding a radical change in our educational system. They point out that eighty per cent. of the population is educated at public expense up to the age of fourteen or fifteen only and the remaining twenty per cent. are educated at private expense up to eighteen or even twenty-two. The socialistic tendency of the age causes educationalists—and schoolmasters have always been great socialists—to demand free and uniform education for all, higher education being reserved solely for those who show themselves to be mentally equipped for it, and having nothing to do with the parents' bank balance or previous history. In the words of Professor Joad: "It is impossible to overestimate the difference for our civilisation which the recognition of this single principle would make."

No one will deny that all who have adequate mental ability should be enabled to make the fullest use of it. It seems inevitable that the school-leaving age will be raised to sixteen. By that age, boys in public schools have generally passed School Certificate or Matriculation. If the standard reached in the free schools is not equally high it is not the fault of the educational system as such, but it suggests either that the raw material is not capable of being worked up to the same pitch or that the teaching is at fault. Is not the fundamental change which is required in education no more than one of upgrading the standard and teaching of the free schools? It is not true to say that education at universities is open to all who can pay for it. It is necessary for a pupil to have matriculated before he is admitted to a university. We agree that anyone who has matriculated and who desires to spend another five or ten years in his education should be entitled to free education at a university so long as he continues to reach a minimum standard. There are many objections to the socialistic system which is so often proposed, not the least of these being that some people develop late in life and may not matriculate until long after the school-leaving age. Means must be provided whereby a university education is open to anyone who can reach the desired standard, no matter what his age.

Education, however, cannot be divorced from industrial requirements. A time may come when industry will be entirely operated and staffed by skilled men. The skilled workmen employed to-day, however, engineers, electricians, carpenters, charge-hands, and so forth, are very far removed in their technical knowledge from the skilled executive who supervises and directs their work. There are, moreover, very many trades that demand even less mental skill, yet call for a certain experience and manual dexterity. Coal mining is among these. Industry requires, and for some generations will probably continue to require, large numbers of men who are satisfied to do work of this character. If these men have been educated in the manner here suggested, the way to advancement by their own efforts is open. The great majority of them have no such desire: once they leave school most men do not wish to study farther. Those of the more ambitious minority who are prepared to do so concentrate on the technical subjects that will be of use to them in their daily work. For such men evening classes provide an opportunity of study. Unfortunately, the standard of evening classes is too often confined by the average standard of those attending them, and there is difficulty in proceeding up to degree standard as a result of evening-class work unless the student happens to be particularly brilliant. The particularly brilliant boy or girl can gain scholarships to-day. One of our tasks must be to see that the penury of the parents does not prevent the acceptance of the scholarship.

Those who desire to continue their technical education after the school-leaving age but who cannot attend universities should be provided for by part-time education at the expense of their employer or at least in their employer's time. Mr. J. H. Clayton has recently published in *Chemistry and Industry* some particulars of a scheme which his companies have inaugurated for foremen and assistant foremen. Classes in chemistry and physics, later extended into other subjects, are held for two hours' duration on two afternoons each week, during which time the men are released from their duties. These classes have evidently been a very great success and undoubtedly, in Mr. Clayton's words: "All workpeople should be made to understand the problems of their industry and be taught its position in the scheme of world affairs."

NOTES AND COMMENTS

Raw Materials

SELF-SUFFICIENCY was before the war an objective of most debtor nations and of all nations that were preparing to wage war. In this form the insistence upon home production is to be deprecated and it is hoped that after the war means will be found to cause international trade to flow freely. War, however, is causing all nations to exploit to the full whatever natural products they are possessed of. Parliament in its wisdom has decreed that Highland water power shall not be used to its fullest extent for industrial purposes; whether we can afford to be thus careful of what are known as "amenities" remains to be seen. Professor Granville Poole of King's College, Newcastle-upon-Tyne, has lately suggested that the Government should help in the development of the mineral wealth of the North-East District. His survey has shown that the area is fairly rich in mineral deposits and he considers that the output of fluorspar, lead, and barytes could be increased. There are in other districts minerals of considerable potential value that might be exploited at the present juncture when costs matter less than availability. A time like the present is indeed peculiarly advantageous for starting ventures of this character, since it is often the initial expense of starting production and getting over teething troubles which prevents exploitation. It is a sign of the times that the Department of Scientific and Industrial Research has sent two members of its staff to Ireland to study the production of peat fuel as a possible means of supplementing coal supplies. Peat has always been a peculiarly difficult material to handle for fuel purposes because of its high water content and the consequent cost of drying. It is doubtful whether our peat deposits will ever be utilised other than desultorily except as a war measure until we begin to run short of coal.

Distribution and Waste

IT may be that historians will trace the inception of the present war to inequalities in the distribution of raw materials over the earth's surface. The feeling has been widespread in many of those countries that did not possess extensive colonies that they were being unfairly deprived of essential raw materials required for their home industries by those nations that administered the countries where the same raw materials were found. We know that this is a fallacy, but undoubtedly care must be taken after the war to see that whoever owns the materials, they shall be made available to all at the same basic cost on rail or ship at the place of origin. This is a difficulty which seems likely to settle itself in the course of time. Mr. Kewley, lately chief chemist of the Shell-Mex Group, stated at a meeting of the Royal Society of Arts recently that he viewed with considerable misgiving the wanton waste of raw materials. He pointed out that the rate of use of minerals which are irreplaceable is proceeding with a geometrical progression, the consumption being often multiplied many times in the course of a few years. He believes that the inevitable result must be a shortage of such substances as gold, platinum, iridium and many of the rarer elements which are now beginning to find a use in industry. Though it is likely that substitutes will be found, such as have been discovered in our lifetime in plastics, artificial silk and in other directions, Mr. Kewley looks to scientific invention to find means whereby coal and oil can be replaced by other forms of energy, and he foresees an increasing resort to the treatment of sea water for the recovery of many elements which are now obtained from minerals. There are many substances which, although contained in sea water to only a minute amount, yet are to be measured in huge quantities when the vast bulk of sea water is taken into consideration. We may be dependent upon the life in sea water for many things; it is calculated that if spread uniformly over the surface of the sea the organic life that it contains would make a layer some two or three feet thick, whereas the life on land if spread over the whole land area would only amount to the thickness of a small fraction of an inch.

The Value of Research

MR. KEWLEY'S obvious belief in the efficacy of research for solving difficult problems is well founded on his experience in the oil industries. The principle on which that industry operates seems to be to turn difficulties over to the research department. Capt. Cadman has related how, when hydrogen was wanted for U.S.A. dirigibles, the oil industry developed plant for obtaining it by cracking hydrocarbons, producing carbon black as a by-product. Industrial users of this carbon black found it to be valueless for their purposes and it was thrown away or burnt. Then came the use of helium for dirigibles and the oil industry's hydrogen plant was put out of operation. But it was not scrapped. Research men reinvestigated the despised carbon black and decided it was good. They demonstrated this belief to the users and ultimately the cracking plant was used for the production of carbon black, hydrogen being the by-product. A second basic principle of the oil industry is one that might well be applied more widely in British industry: courage to apply the results of research. If an improved new method is found the older method and the plant connected therewith are ruthlessly scrapped; generally the change is completely justified and the new plant pays for itself in a very short time. Incidentally, the petroleum industry is within sight of manufacturing synthetic soap. The basis for this is the higher olefines containing from 10 to 18 carbon atoms; these olefines are then converted into their sulphate salts, but no other details are yet available.

Fundamental Research in Industry

THE value of long-range research has never been better illustrated than in the account given by Dr. E. K. Bolton of the discovery of nylon in the laboratories of E.I. du Pont de Nemours and Co., on the occasion of his presentation with the Chemical Industry Medal in New York. In 1927, in order to safeguard the future growth of the company, it was decided to set up a department with the sole function of carrying out fundamental research in organic chemistry, under the direction of Dr. Carothers. The subject chosen was that of polymerisation by condensation and the structure of substances of high molecular weight. The use of the molecular still was found to enable products to be isolated of higher molecular weight than hitherto obtainable with ordinary vacuum distillation apparatus; this was effected by the better elimination of water formed by the condensation reaction. By this discovery it became possible to produce substances having molecular weights between 10,000 and 25,000. These melted at an elevated temperature into transparent viscous liquids, from which filaments could be obtained by pulling threads with a rod. When these filaments had cooled they could be further drawn to several times their original length, and the cold-drawn fibres were quite different in physical properties from the parent substance; they developed transparency and a high degree of lustre while possessing a much high tensile strength and elasticity than undrawn filaments. The material was, however, too infusible and insoluble to be tested for availability for spinning. The research appeared to have failed to produce practical results. After an interval, however, it was restarted and ultimately a superpolymer from hexamethylenediamine and adipic acid was produced. The cold-drawn fibres from this had the requisite high tensile strength and elasticity, they were insoluble in common solvents, and melted at 263° C., which gave a margin of safety above commonly-employed ironing temperatures. This was the basis of nylon from which the intricate processes of commercial manufacture were developed by other departments of the company.

(*Contents appears on page 71*)

America's Bauxite Resources*

Possible Concentration of Low-Grade Ore

TECHNICALLY speaking, bauxite is not a definite mineral, but a mixture of several minerals belonging to a group of partly consolidated materials known as laterities, which have been formed by surface weathering of rocks. The term bauxite is applied to the ore of aluminium, although a substantial amount is used for other purposes, such as a base in certain chemical industries and in the manufacture of artificial abrasives, refractories, and certain cements. Although bauxite has not been classed as strategic it now appears that the domestic supply may be insufficient for expanded defence requirements. Until recently, United States production of metallic aluminium has been ample to meet requirements, but estimates of future needs of the defence programme have caused serious attention to be directed to national self-sufficiency, both as to the supply of the raw material, bauxite, and the metallurgical capacity available to convert the ore to metallic aluminium.

The geographical distribution of bauxite may be briefly characterised as confined to two general areas, the Coastal Plain and the Appalachian Valleys of the South-Eastern United States. The geological relations are only slightly less simple. The deposits in the Coastal Plain are nearly all at the contact of two early Tertiary sedimentary units, the Palæocene Midway group and the Eocene Wilcox group, or on surfaces exposed at the end of Palæocene time. It is believed that the alteration to bauxite of the material in the clay-filled sinks in the Appalachian Valley areas also occurred during early Tertiary time.

American bauxites are not uniform in physical or chemical character. The two most diverse types of material, found in Arkansas and Mississippi, are the hard, or rock bauxite and the soft, claylike form. As the Arkansas deposits account for over 97 per cent. (437,595 tons in 1940) of the bauxite produced throughout the country, a brief description of some of its characteristics is included here.

The Arkansas Deposits

The largest bauxite producing area in the United States is in central Arkansas. Here the ore occurs in two separate districts—one in Saline County and the other in Pulaski County. The Saline County district is by far the larger. Two outcropping areas of intrusive nepheline syenite comprise the sites of these two main bauxite deposits.

As nepheline syenite is a rock composed largely of felspars and felspathoid minerals, it contains and abundance of the raw material from which Nature may produce bauxite. Other essential factors needed by Nature to produce bauxite from aluminous silicates are a favourable climate and long periods. During long periods of weathering, lenticular bodies of clay and kaolin were developed on the surfaces of the syenite masses and later, through desilicification and hydration, the kaolin deposits were transformed into bauxite. Thus at places on the masses of syenite there was formed a blanket of kaolin which merges upward into a blanket of bauxite. The bauxite-kaolin zone is marked by springs on hillsides where water from sandy beds is diverted when it reaches the less pervious clay.

Bauxite has been mined in Arkansas since 1899. The most productive area lies south-east of the mining village of Bauxite, in Saline County. This area has furnished by far the greater part of the ore produced. At first the ore was obtained from open-cuts along the outcrop or from places where it was practicable to remove the overburden. Much open-cut mining still continues, but where the overburden has become too thick for open-cut work, drifts and tunnels have been extended underground, followed by sinking of shafts, and for many years more bauxite has been mined underground than has been recovered from strip pits. Recently, however, an effort has been made to remove overburden on an unprecedented scale for the sake of the higher percentage of recovery of ore that is thus made possible. Bauxite for the manufacture of aluminium has predominated here over that for chemical products, abrasives, refractory materials or cement, though, taking the country as a whole, aluminium manufacture accounted only for proportions varying from 46 to 49 per cent. in the years 1937-40.

Each of the industries for which bauxite is mined has set up certain specification requirements. In some instances these are quite rigid, while in others there is considerable tolerance. The common commercial grades, with their chemical requirements, are as follows:—

Grades.	Form in which used.	Principal chemical constituents (percentage range). Al_2O_3	SiO_2	Fe_2O_3	TiO_2
Aluminium	Dried	55-62	2-7	3-8	2-4
Chemical	,,	54-62	2-11	1-2.5	1-3
Abrasive	Calcined	80-86	4-8	4-9	2-5.4
Refractory	,,	78-86	5-8	2-4	1-4
Cement	Largely undried	52-56	2-3.5	2-15	2-4
Oil refining	Activated	75-80	4-10	5-9	3-4

It will be noted that the tabulated specifications require that for metallic aluminium the bauxite must contain at least 55 per cent. alumina and not more than 7 per cent. silica, whereas the iron oxide may amount to as much as 8 per cent. and titanium oxide 4 per cent. On the other hand, although the alumina content for purposes of the chemical industry must virtually equal that for the aluminium industry, there is more tolerance in respect to silica, but less in respect to iron oxide.

Research on Low-Grade Ore

The Bureau of Mines is at present engaged in research concerning beneficiation of low-grade bauxite ores by the removal of some of the silica by flotation. At the time of writing, this study has not reached a point where definite conclusions can be drawn as to all types of ore, but laboratory experiments indicate encouraging results.

The fact that laboratory experiments have shown that some bauxite ores with as much as 12 or 15 per cent. silica can be concentrated to 6 per cent. or less by flotation supports the suggestion that such ores may be classified according to alumina content for reserve purposes. For purposes of this report, bauxite reserves are graded as follows:—

Grade.	Alumina, per cent.	Silica, per cent.
A	over 55	less than 7
B	50 to 55	less than 15
C	45 to 50	less than 30
D	30 to 45	high in silica and iron.

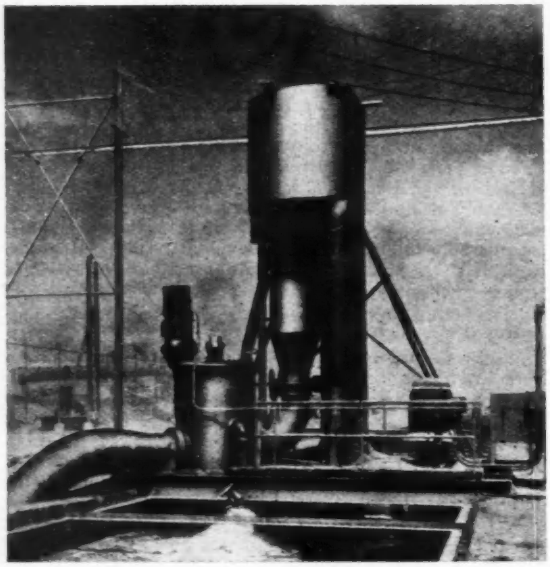
Of the known bauxite reserves throughout the United States, Arkansas accounts for 27,254,000 tons, of which 9,090,000 are of Grade A, 8,443,000 Grade B, 7,803,000 Grade C, and 1,918,000 Grade D. Total reserves are in the neighbourhood of 29 million tons.

At present only Grades A and B can be depended upon as a supply of aluminium ore, for the concentration of the lower grades has never been attempted commercially. Unless, therefore, they are subsequently found to be amenable to concentration or can be used in some process other than those now in operation it is doubtful whether they can be considered a source of metallic aluminium. On the other hand, if it can be demonstrated (as recent research indicates) that alunite containing 18.5 per cent. alumina can be utilised commercially, it seems reasonable to assume that with proper modification the extraction process used for alunite of that grade could be used with at least some success on Grade C and D bauxite ores and thus extend the life of domestic resources 2 to 3 years more.

* Abstracted from Bureau of Mines R.I. 3598 (by J. R. Thoenen and E. F. Burchard).

MAGNESIUM FROM THE SEA

Some Details of the Dow Chemical Plant in Texas



Centrifugal pump, delivering 10,000 gallons per minute, for raising sea-water to the magnesium chloride plant

IT is almost exactly one year since the first commercial ingot of any metal to be taken from sea water at any time in the history of the world was produced at the Dow Chemical Company's magnesium plant at Freeport, Texas, U.S.A., adjoining a recent plant expanding the company's operations of extracting bromine from the sea. On January 21, 1941, a veteran operator of the company poured the first ingot of magnesium metal made in the factory, and now the Dow Chemical Co. has received, from *Chemical and Metallurgical Engineering*, the fifth biennial award for a "meritorious contribution to the advance of the industry and profession" of chemical engineering. Previous recipients of the award have been Carbide and Carbon Chemicals, du Pont de Nemours, Monsanto, and Standard Oil Development.

A full account of the Freeport plant, by S. D. Kirkpatrick, is included in the issue of *Chemical and Metallurgical Engineering* for November, 1941. Extracts from this which should prove of interest to our readers are reprinted here, with illustrations from the same source.

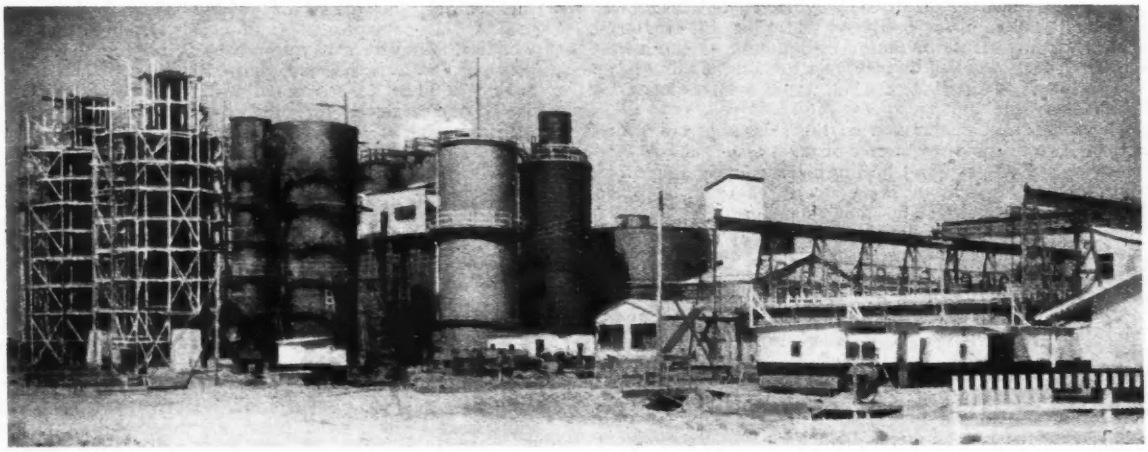
As the sea flows into Freeport Harbour, the heavier salt water lies beneath the fresh water on the surface. Hence the main plant intake is almost 30 ft. beneath the surface so as to obtain the highest concentration of the desired ingredients. Here some 300,000,000 gal. per day of sea water are drawn into the plant by four Worthington centrifugal pumps, each with capacity of 71,000 g.p.m. Normally, only three pumps are in operation with one standing by for relief service. Each pump is driven by a 500 h.p. direct-connected induction motor.

The sea water first passes through Link-Belt screens of the "roller-towel" type such as are widely used in screening municipal sewage. The coarser trash and refuse are held on its 1-in. openings. Then follows a group of 6-mesh rotary screens of a special type that Dow engineers had developed at their bromine plant. From these screens the clean sea water flows into a 10-ft. flume that traverses the plant site and carries the stream of raw material for both the magnesium and bromine operations. Because of the smaller concentration of bromine in the water, the Ethyl Dow plant requires many times the volume of water needed for the magnesium process. That part of the sea water used for magnesium production is lifted from the flume at two places by centrifugal pumps that will deliver 5000 to 10,000 g.p.m. and at the same time give it the 10-ft. head required for flow to the first operation.

The second important raw material, the oyster shells from which the lime is made (for precipitating magnesium hydroxide), is dredged from the bottom of Galveston Bay and brought by barges to the plant. They are unloaded by clam-shell buckets and carried by a gantry to the shell washer. Here ocean water is used to remove sand and dirt. The washed shells go either to the huge storage piles or directly to the lime kiln. This 300 ft. natural gas-fired lime kiln is a Traylor unit, connected direct with the lime slakers. The milk-of-lime slurry from the slakers is pumped to one of the five thickeners in the Dorr unit. This is 150 ft. in diameter with 18 ft. side walls constructed of patented interlocking steel piling set in concrete, approximately nine feet below the level of the ground. The four other Dorr thickeners, which are operated in parallel on the magnesium hydroxide slurry, are 200 ft. in diameter.

The lime slurry meets the sea water in the flocculator, which is of standard Dorr construction. It is a rectangular concrete tank, 28 ft. wide, 14 ft. deep, and 80 ft. in length. The milk of lime is fed into the tank through launders or weirs which are on the surface and spaced at about equal

Lay-out of the Dow Chemical Company's plant at Freeport, Texas



After neutralisation, the magnesium chloride passes first to the direct-fired evaporators here shown. Impregnated wood scrubbing towers are under construction in the foreground on the left

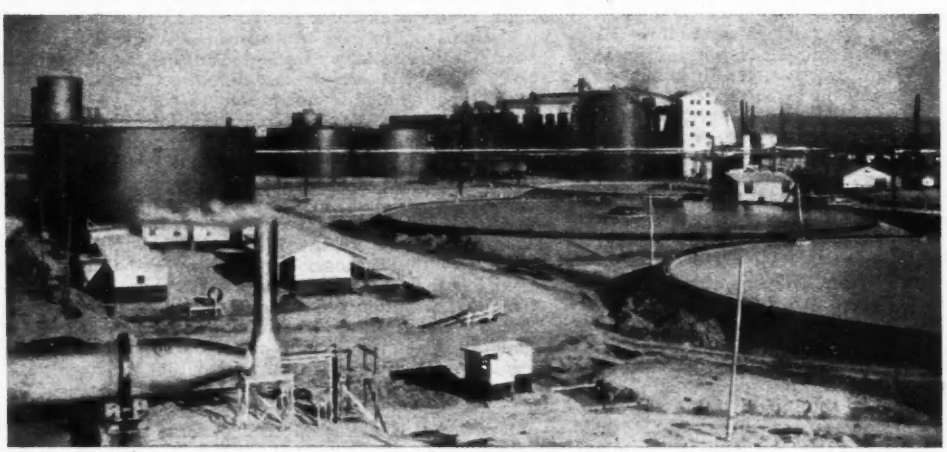
distances across the top of the tank. The sea water enters at one end and passes over baffles as it traverses to the other. The contents of the tank are slowly agitated with a reel- or barrel-type agitator extending the length of the flocculator. Careful control of the liming operation requires precise adjustment of the *p*H of the mixture. A glass electrode unit, with calomel cell, relays its readings to a Leeds and Northrup Micromax recorder in the control house. Manual control is based on frequent laboratory titrations, also made in the control house.

The magnesium hydroxide floc suspended in sea water is then distributed to the four other Dorr thickeners. The clear overflow into the launders goes to the pump basin and ultimately to the waste water canal. Being slightly alkaline, it helps to neutralise the weakly acid waste from the bromine plant. The heavy "milk-of-magnesia" underflow from the thickeners is picked up by Dorrco sludge pumps and carried to the storage or retention tanks ahead of the filters.

To filter the large volume of magnesium hydrate floc calls for an impressive example of unusual chemical engineering design and construction, especially in a chemical plant. Huge Moore filters of a type once widely used in Western metallurgical plants have been redesigned to accomplish this unit operation. Fully 90 ft. in length, each with approximately 100 canvas-covered leaves, the filtering units are lifted, lowered, and shifted by a large overhead crane. First the filter unit is lowered into the rectangular concrete tank into which the magnesium slurry has been pumped. Suction is then applied until a cake an inch or 1½ in. in thickness has been built up on the leaves. Then the crane lifts the unit, carries it over, and lowers it into an adjoining compartment where air is applied to loosen the cake. This drops off and a screw conveyor at the bottom of the tank carries it to the neutralising unit. Here, in rubber-lined steel tanks, the hydrate meets the 10 per cent. HCl solution which converts it back into the magnesium chloride required for the subsequent electrolysis. The hydrochloric acid has been made elsewhere in the plant by burning natural gas in the by-product chlorine from the magnesium cell house, supplemented with make-up chlorine from the electrolytic caustic soda cells in an adjoining building.

Now begin the magnesium chloride concentrating and drying operations that depart a long way from standard practice and equipment. The first step employs direct-fired evaporators. The dilute magnesium chloride solution is sprayed into the top of a cylindrical brick-lined furnace, nearly 20 ft. in diameter and 40 ft. in height. A spider distributor deflects most of the liquid down the side walls of the furnace in which natural gas is burned under pressure. The steam, along with the products of combustion, passes through another steel tower and finally into one of asphalt-impregnated wood, where baffles remove the entrained water and solution.

The concentrated magnesium chloride solution from the direct-fired evaporators is filtered through four plate-and-frame filter presses to remove solids that have crystallised out in the retention tanks. The filtrate then goes to the so-called shelf-dryers. In principle these resemble the burners widely used for roasting pyrites and other ores. Each is a structure 50 ft. in diameter and at least 50 ft.



Looking across the 200-ft. Dorr thickeners to the magnesium chloride plant. Note the use of interlocking steel piling for side walls of thickeners. On the left is the end of the rotary lime kiln and slaker

high with 12 shelves on to each of which the magnesium chloride is fed from the periphery while the solid material is raked to the centre of the dryer and falls to the lowest shelf. Heat is supplied by two large gas burners and large circulating fans distribute the hot gases over the material on the shelves.

The semi-dried material from the shelves, from which perhaps two-thirds of the water of crystallisation has been removed, receives its final drying to practically anhydrous condition in a gas-fired rotary dryer where it is mixed with previously dried material in flake form.

Details of the magnesium cell construction and operation at Freeport cannot now be described, but it is known in a general way that the cells are rectangular cast-steel pots set in refractory brick furnaces. The steel pot serves as the cathode in the electrolysis. Graphite electrodes enter the open top of the furnaces. The electrolyte is kept molten (670-730° C.) by gas-fired furnaces beneath the pots, or heated by electric power alone. The magnesium chloride charged to the cell bath is converted to magnesium metal in the ratio of about four tons of chloride to one ton of metal. Each cell produces about 1000 lb. of metal per day. The fused metal rising to the top of the cell bath is removed by hand ladles and cast into 18-lb. pigs which have an average purity of over 99.8 per cent.

The magnesium sea-water process is not an achievement of any single individual. Rather it is the result of coordinated group effort that capitalises fully on the broad knowledge and experience found in practically every department of the company. It well reflects the resourcefulness and spirit of independence that have long characterised the Dow Chemical Company.

A CHEMIST'S BOOKSHELF

"ENDEAVOUR," Vol. I, No. 1. A quarterly review designed to record the progress of the sciences in the service of mankind. London: Imperial Chemical Industries. Pp. 48. 5s.

As noted in the columns of THE CHEMICAL AGE a few weeks ago, the primary object of *Endeavour* is to ensure that the evidence of British scientific enterprise becomes better known overseas. If subsequent issues come up to the standard of No. 1, it will certainly achieve its object. Lord McGowan says in the foreword, "We do not apologise if these pages lay emphasis on British scientific work . . . but they will not be marked by any narrow insularity," and his claim is fully justified: the accent is on the service that British scientists have rendered to mankind as a whole, most often in collaboration with scientists of other nations.

The most important article is by the Astronomer Royal, Dr. H. Spencer Jones, and makes public for the first time his 12 years' work (based on co-operation with 24 observatories all over the world) on the distance of the sun. The distance proves to be 93,005,000 miles with an uncertainty of only 9000 miles. Of a more closely chemical interest are A. L. Bacharach's work on "The Manufacture and Use of Vitamins," John Read's reminder of John Ferguson and his *Bibliotheca Chemica*, a work far too little known; F. Fairbrother's brief review of the cyclotron, that stupendous tool of chemical electrokinetics; and N. F. Newbury's brief life of John Glover, of the "Glover Tower." It is perhaps characteristic of the too casual attitude of the British public to their scientific benefactors that no published information on Glover exists in any book of reference; it is certainly typical of the best spirit among British scientists that Glover took out no patent for his invention, but readily showed his working tower to visitors.

Many other articles of widespread scientific interest, most of them lavishly illustrated, are included, the most topical being a review of present-day science in the U.S.S.R., by J. C. Crowther. The first article of all, "Science and the Community," by Sir William Bragg, epitomises the effect of science on the ordinary man, the politician, the industrialist, and the scientist himself. "It is to the honour of many leaders of the business world in this country," he says, "that they have seen how the selfish use of science can end in a cruel tyranny, and have laboured to devote it to the well-being both of those whom they serve and those whom they employ." Scientists, too, have "at least an occasional vision of a vast and right use of their science for the benefit of mankind." It is with the aim of showing that British science is broadly actuated by such motives that *Endeavour* is launched into the world. We wish it every success.

TRANSACTIONS OF THE INSTITUTION OF CHEMICAL ENGINEERS. Vol. 18, 1940. London: Institution of Chemical Engineers. Pp. 147.

Although Volume 18 is considerably smaller than those of previous years, the appearance of the book will be as welcome as ever, and there is one particularly pleasing feature. This is a brief subject-index to the transactions from 1923 to 1940 and also an author-index for the same period. The presidential address by F. Heron Rogers on "Oil," delivered at the 18th annual meeting is printed, and other important contributions which have been read and presented to the Institution are the papers by Donald on "Sedimentation and Flocculation"; by Powell on "Further Experiments on the Evaporation of Water from Saturated Surfaces"; by Farrant on "A Review of Certain Unit Processes in the Reduction of Materials"; and by Ower on "Measurement of the Flow of Liquids and Gases." Possibly it will be found that the most topical article is the slightly abridged general discussion, opened by Dr. A. B. Manning, on "The Salvage of Waste Materials in the Chemical Industry."

CHEMISTRY FOR SCHOOLS, Part I. By C. Jenkins and E. H. Foinette. London: Heinemann. Pp. 97. 3s. 6d.

This handy little book is designed as the first of three volumes of increasing difficulty, leading up to School Certificate standard. The treatment herein of the simplest chemical principles and practices is full, interesting, and well illustrated. Questions at the end of each chapter should be of great assistance to teachers of elementary chemistry, and it is gratifying to note a final section summarising the history of the development of chemistry as far as the downfall of the phlogiston theory.

Canada's Salvage Drive

Paper, Metal, and Rubber Conservation

HOW important in the war effort is the collection of waste paper is illustrated in Canada, the largest pulp and paper producing country in the world. "Every ton of waste paper used in the manufacture of paperboard and cardboard in Canada releases an equivalent amount of wood pulp and paper for export," says the Royal Bank of Canada in its January bulletin. "During sixteen months Great Britain saved waste paper valued at £7,000,000 and great enough in volume to fill forty cargo ships, which were thus released for the carriage of other materials. Available supplies in Canada are enormous. The head office of this bank alone recovers over two tons a week."

Millions of tin cans are thrown away in Canada every year, the writer says. But these present a different problem. It is not economical to collect them "until an emergency renders it imperative to conserve tin without regard to cost. One hundred lb. of tin cans yield only 1.2 lb. of tin; the residual tin which cannot be removed reduces the value of steel scrap to the lowest level." As, however, 75 per cent. of the world's tin comes from that corner of S.E. Asia involved in war with Japan, Canada is not unmindful of a time when salvage needs might outbalance salvage costs. "It is estimated," says the bulletin, "that 2,000,000 tons of iron and steel scrap lie in the basements, dumps, and automobile graveyards of Canada. A nation-wide campaign for its collection, and that of aluminium and other non-ferrous metals, is continuous. A smelter turning out 10,000 tons of steel a week using iron ore alone, can raise its output to 25,000 tons by using ore and scrap."

Restrictions in Canada on the consumption, sale, and processing of rubber have been in force for some time.

Personal Notes

MR. W. MURRAY MORRISON, vice-chairman and managing director of the British Aluminium Company, has been awarded the platinum medal of the Institute of Metals in recognition of his outstanding services to the non-ferrous metals industries.

MR. F. G. LENNOX, of Melbourne, has been awarded the Rennie Memorial Medal of the Australian Chemical Institute. The medal is presented annually for the most outstanding contribution to chemistry in Australia by a chemist under 30 years of age.

MR. J. ALLEN HOWE has been elected president of the Council of the Institution of Mining and Metallurgy for the year 1942-43. He has been a member of international conferences on testing materials, and was for a number of years adviser on stone to H.M. Office of Works.

MR. F. J. S. HALL, who has been appointed managing director of the Horton Manufacturing Co., Ltd., soap manufacturers, Rickmansworth, Herts, has served 15 years with the firm, first as head chemist and since 1930 as works manager. Since his election to the board of directors in 1937, he has taken an active part in the management.

In our last week's issue in this column we stated, owing to an inadvertence, that LIEUT.-COL. B. J. EATON, O.B.E., had been appointed Secretary of the Research Association of British Rubber Manufacturers in succession to the late MR. B. D. PORRITT. As is well known, Mr. Porritt was not Secretary but Director of Research of the Association, and he has in fact been succeeded by DR. J. R. SCOTT, who is Acting Director of Research. We herewith express our apologies for this error to the gentlemen whose names were involved.

Obituary

MR. HERBERT KAY, who died at his home in Ullswater Road, Blackpool, on January 21 in his 75th year, was a director and one of the founders of James Kay and Sons, Ltd., soap manufacturers, Ramsbottom, Manchester.

MR. JAMES LEONARD WHINYATES, who died on January 17, aged 58, was well known in Widnes as a works chemist. Suddenly taken ill while travelling in a friend's car, he was carried to a neighbouring house where he died almost at once.

MR. HARRY HEYMANN, who died recently at the age of 73 after a prolonged period of ill-health, has been chairman and managing director of the Horton Manufacturing Co., Ltd., soap manufacturers, Rickmansworth, Herts, since 1926. Before that he was associated with the chemical and dyestuffs industries in Bradford, and was the founder of the firm there that bears his name.

New Control Orders

Revocation of "Empire" Shellac Licences

THE Open General Licence permitting the importation, without separate licence, of shellac from the British Empire, Palestine and Transjordan, the Free French Colonies, the Belgian Congo and Ruanda-Urundi has been revoked with effect from January 26. From that date separate licences will be required, but this will not apply to goods which are proved to have been despatched to the United Kingdom before January 26, and imported into the United Kingdom before March 26, 1942.

The attention of importers is directed to the fact that the term "shellac" includes seedlac and sticklac. Forms for application to import shellac may be obtained from the Import Licensing Department or from the Collectors of H.M. Customs and Excise.

Export Licensing

Under the Export of Goods (Control) (No. 4) Order, 1942 (S.R. and O. 1942, No. 68) which comes into force on February 10, export control is extended to cover chlorinated diphenyls and preparations thereof; packaging, sealing, and labelling machinery; and various other classes of articles.

The existing licensing requirements with respect to glue, gelatine, and size, and tools and parts of tools manufactured wholly or mainly of iron and steel are superseded by the provision that licences will in future, be required to export casein glue, glue, gelatine and size, derived from animal or fish; mixtures consisting wholly or mainly of the foregoing; and certain specified tools manufactured wholly or mainly of iron and steel.

Paint, Lacquer, and Varnish

A Direction issued by the Minister of Supply, which came into force on January 17, exempts from the provisions of the Control of Paint, Lacquer, and Varnish (No. 1) Order, 1941 (*see* THE CHEMICAL AGE, January 6, 1942, p. 6), the buying or selling of any material which is on the "manufacturer's approved free list of paints, lacquers, and varnishes," that is to say a list, approved by the Minister and prominently displayed in the seller's premises, setting out the paints, etc., which were before December 26, 1941, packed ready for disposal or stored in bulk.

Purchase Tax on Toilet Soap

After discussion with the Soap Makers' and Fat Splitters' Federation, the Commissioners of Customs and Excise have decided, to restate the liability to purchase tax of soap, made up for sale as toilet soap, as follows:—

Purchase tax will be chargeable in all circumstances on hard soap containing 70 per cent. or more of fatty and rosin acids; and on soap in all forms which is described or sold as toilet soap.

The following articles are not chargeable with tax except as provided above: household soap; hand soap (in solid, liquid or paste form) which contains abrasives or other special ingredients for the removal of excessive dirt or grease; liquid soap specially prepared for a specific industrial purpose, *e.g.*, as a basis for insecticides or disinfectants or as a cutting medium; and soap flakes, soap powders, household ammonias, and disinfectant cleansers.

Chemical Matters in Parliament

Vitamins for Pharmaceutical Use

IN the House of Commons last week, Captain Elliston asked the Parliamentary Secretary to the Ministry of Food whether, considering the importance of vitamins in modern medical treatment, restrictions on the use of these products for pharmaceutical purposes would be removed.

Replying, Major Lloyd George said that there were no restrictions on the use of vitamins B1 and D for pharmaceutical purposes, and vitamin A was still available in reduced quantities, but it was not possible to increase the present supply owing to the large demands for this vitamin for the fortification of margarine. As regards vitamin C there was no restriction on the use of ascorbic acid for tablets and other "straight" preparations. There was, however, a voluntary restriction with the manufacturers whereby pharmaceutical manufacturers of proprietary brands of multi-vitamin preparations were allowed supplies of ascorbic acid on the basis of their average usage in the first five months of 1941 prior to the introduction of the Vitamin C Control Order on June 2 last.

Regional Fuel and Power Controllers

The President of the Board of Trade was asked to define the functions of the regional fuel and power controllers, and by what authority they were issuing questionnaires, the answering of which imposed a heavy burden on the mining industry. Sir A. Duncan said that he appointed the controllers for the purpose of ensuring adequate co-ordination in matters concerning the supply of the different kinds of fuel and power and in emergency conditions to take charge under the Regional Commissioner. The Controllers were therefore acting on his authority, and, he added, it was unfortunately quite impossible to get information without asking questions. The number of returns to be made by the mining industry in different connections was already, however, the subject of investigation by a committee appointed by the Coal Production Council.

Minerals of Mozambique

African Raw Materials Await Development

THE expiry of the charter held from the Portuguese Government by the Mozambique Company, covering an area of over 65,000 square miles in Portuguese East Africa, calls attention to an area rich in mineral wealth still largely awaiting exploitation. Although the railway from Beira to Salisbury in Southern Rhodesia traverses the area, its potentialities are little known outside its own boundaries, and the article by Dr. L. L. Colin, in *The South African Mining and Engineering Journal* of December 27, is therefore especially interesting. Dr. Colin himself acknowledges his indebtedness for records and data to Dr. Pires de Carvalho, director of mines at Macequece, chief town of the richly mineralised district of Manica. The first geological survey of the area dates from the brilliant pioneer work carried out in 1900 by Freire de Andrade.

The most important mineral in the district is gold, which has accounted for £1,100,000 of revenue in the period 1903-38; but more interesting from the chemical standpoint are certain deposits of less intrinsic value. Bauxite, for example (which brought in only £662 of revenue in the same 25-year period) is found in a large deposit at Penhalonga. The quality, moreover, is high, analyses showing a minimum of 60 per cent. Al_2O_3, while the Fe_2O_3 content is never higher than 3 per cent. High quality alumina refractory bricks have been made from this material. In the districts north of the railway samples of graphite have been found giving on analysis 11.67 and 13.71 per cent. crystalline graphite.

Many of the gold reefs themselves abound in sources of baser metals. Scheelite and wolframite are the chief discoveries, but some fine specimens of molybdenite also occur (though in lesser quantity) and lead in the form of galena appears in the Penhalonga reef. Copper, largely in the form of malachite was extensively mined up to 1921, and tin, both as cassiterite (associated sometimes with wolframite) and in the alluvial form, occurs. Copper mining has now entirely ceased, and the tin exported in 1940 amounted to only 13 tons. Coal, apparently of high quality, exists in large quantity (estimated roughly at 105 million tons) on the Southern Rhodesian border, and a high-grade deposit of hæmatite has been located at Mlange near the Nyasaland frontier. Samples taken from this last show an average iron content of 70 per cent., with the unusually low silica value of 0.22 per cent. A rough estimate places the total tonnage of this iron ore deposit at 80 million.

Power and transport facilities await improvement, and a programme with this end in view is under operation. On its completion it would appear that a large and varied mineral industry is capable of development in this "unknown" area of South-East Africa.

German Producer-Gas Policy

Increasing Reliance on Bituminous Fuel

THE fuel policy of the German motor authorities has always been directed at the increased use of producer gas for commercial vehicles with a view to saving liquid fuel. Important changes have, however, been made from time to time, and the latest of these has just come into operation. From the beginning of this year no commercial vehicles may be converted to generator gas in Germany if the engine cannot be fed by fuel materials other than wood or charcoal. At the same time it has been announced that priority will be given to the conversion of vehicles to use of town gas, long-distance gas, sewage gas, and methane if a filling station for any of these gases is easily accessible.

Special efforts are being made to develop bituminous fuel materials for use in generators. Peat with less than 3 per cent. of ash and traces only of sulphur has proved a good generator fuel provided it is not too sodden, but peat briquettes are rather too expensive; this year 60,000 tons of peat are to be used for gas generation. Lignites do not lend themselves to universal use, but those from the Rhineland and the Sudetenland have been found suitable. Coal itself cannot be used, but coke is being employed in generators, and a new process is claimed to provide an almost pure fuel from coal. The by-products of coal-oil production yield a high-class gaseous fuel, and it is thought that full utilisation of various bituminous materials can add considerably to the total fuel supply for commercial road vehicles.

Although the cost of conversion is substantial, so many applications for conversion are received by the German authorities that only a fraction of all the vehicles registered can at any time be dealt with. Conversion of passenger cars is not permitted at all, and commercial transport undertakings have to wait a long time. If possible, vehicles are equipped with generators adaptable to a variety of fuel materials, as interruptions and changes in supply have been frequent. As far as wood is concerned, it is now claimed that soft wood with up to 20 per cent. moisture can be used in normal generators, while the engines used for agricultural tractors may run on wood with up to 40 per cent. moisture.

New British Standards

Crude Sperm Oil

THE British Standards Institution has just issued a British Standard for Crude Sperm Oil, B.S. No. 997, one of a series of British Standards for marine, animal and fish oils, four of which have already been published. The specification requires that the oil shall be the product obtained from the head, blubber, or carcase of the sperm whale, and that it shall be free from contamination or mixture with other oils and fats. Limits are laid down for the moisture and dirt, the iodine value, the colour, the specific gravity of the filtered oil, the saponification value, the acidity, and the unsaponifiable matter. In appendices the methods for determining these properties and impurities are given.

Flow-Pump Specifications

The Institution has also issued, with the approval of the Pumps Sub-Committee of the Industrial Capacity Committee of the Production Executive, War Emergency British Standard Centrifugal and Axial Flow Pump Specifications and Data required for Estimates and Orders, B.S. 994. This Standard has been drawn up as a war-time measure with a view to expediting manufacture by allowing as much latitude as possible. It lays down the latitude allowable in the interpretation of purchasing specifications and of test results of centrifugal and axial flow pumps. The accompanying list of data required to be given with inquiries covers all general cases and is given with a view to preventing waste of time in the initial stages owing to information given to manufacturers for quotation purposes not being correct and complete. This standard does not in any way modify the existing British Standards which deal exclusively with pump tests.

Copies of either of these specifications may be obtained from the British Standards Institution, 28 Victoria Street, London, S.W.1, price 2s. 3d. post free.

CHROMIUM PLATING RESTRICTIONS

After giving full consideration to the claims of various industries upon the supplies of chromic acid available it has been decided by the Ministry of Supply that in the national interest chrome plating should be discontinued for the following purposes: electric fire reflectors, sole plates for electric flat irons, electric fittings and gadgets, motor car, motor cycle and bicycle fittings and accessories, office appliances and machinery (including typewriters), weighing machines (spring balances, scales, etc.), fans, and electro-plated ware and fancy goods.

Soda ash produced by South African Alkali, Ltd., rose by 115 tons to 2635 tons in the year ending June 30 last, though the purity percentage fell from 97.4 to 95. Salt output in the same period dropped from 3835 tons to 3810 tons.

General News——From Week to Week

There will be no change in the existing prices of oils and fats allocated to primary wholesalers and large trade users for the four weeks ending February 28.

For using unfenced machinery, whereby a workman was injured, Thomas Vickers and Sons, Ltd., manufacturers of superphosphates and compound fertilisers, Widnes, were recently fined £20 at the Widnes Police Court.

Mr. Eden told the House of Commons last week that for practical reasons the British and Soviet Governments had decided to postpone the proposed exchange of scientific missions between the two countries.

A new Trade Member of the British Cast Iron Research Association, announced in their January bulletin, is English Clays Lovering Pochin & Co., Ltd., of St. Austell, represented by Mr. R. J. Davies.

The Distillers Co., Ltd., General Works Dept. (England), is returning to its former offices at 21 St. James's Square, London, S.W.1. Telegrams: Genworkdep, Piccy, London. (Tel.: Whitehall 9561).

Following the meeting held in London on January 23, to consider the expansion of Cornish tin output, a further meeting was held in Cornwall this week, when the subject was discussed by members of the Cornish Institute of Engineers.

As an experiment, trade unions are to co-operate with the Glasgow Corporation Gas Department in a voluntary scheme for the protection of the health of the employees at the department's chemical works. The scheme will be reviewed at the end of 12 months.

The L.M.S Railway is making use of a special type of fluorescent chalk markings to expedite the handling of freights in marshalling yards. This follows the adoption of luminescent signs by London Transport at certain Underground stations, as already recorded in these columns.

Enamelling Abstracts, Vol. I, No. 11, has just been issued by the Joint Committee on Vitreous Enamelling. Those interested, who are not members of the Institute of Vitreous Enamellers or the British Cast Iron Research Association, may obtain single copies for 1s. 6d. (post free) from the Committee at 21-23 St. Paul's Square, Birmingham 3.

An illicit still, discovered by Excise officers at Peckham, London, S.E., and used to distil alcohol from a fermented mash of sugar-beet, is said to have exhibited considerable skill in chemical engineering in its construction. The hot liquor tank had a capacity of 100 gallons. The owner is reported to have manufactured (among other things) "cherry brandy" only 15° under proof.

If all the factories in this country each turned out merely one cwt. of paper, their combined contribution to the national collection would amount to no less than 4500 tons. Grocers, each providing one cwt., would hand over altogether about 4000 tons; accountants and auditors, more than 2740 tons; haberdashers and drapers, 1396 tons; painters and decorators, 1220 tons; chemists, 914 tons; insurance agents, 900 tons; solicitors, 890 tons; ironmongers and hardware merchants, 865 tons; and hotels, about 650 tons.

Applications are invited for the Procter Memorial Fellowship for 1942. The candidate, who may be of any nationality, should normally be a graduate in leather chemistry or possess equivalent qualification; the Fellow must devote the whole of his time to research in the Leather Industries Department of Leeds University; he will be appointed in July and start work in October. Full particulars of the Fellowship, which is worth about £130 per annum, may be obtained from the Registrar, the University, Leeds 2, and applications must reach him not later than March 31.

Foreign News

Questions being dealt with by the Economic Committee of the Pan-American Conference in Rio de Janeiro include that of establishing an aluminium industry in South America.

A dyestuffs advisory committee has been formed in Canada to assist the supply and distribution of dyestuffs. It is under the chairmanship of Mr. Edward A. MacKinnon, Canadian Industries, Ltd., Montreal.

The use of iridium and its alloys in the manufacture of jewellery has been prohibited in the U.S.A., in order to conserve the metal for military use, primarily in the manufacture of hardened magneto points for aircraft.

The extraction of petrol from shale is the main objective of a number of co-operative groups recently formed in New South Wales. A Federal Government concession allows members of these groups to produce petrol for their own unrationed use.

Production of sulphite alcohol in Sweden amounted to 22 million litres in the first half of 1941, and it is expected that an output of 30 million litres will be recorded for the second half of the year.

No less than 60 per cent. of all German textile requirements are now covered by synthetic fibre, it has been officially announced in Berlin. The forests of the eastern territories supply a valuable raw material basis for "cell wool," but it is intended to rely in future more on annual plants; experimental work in this direction is now under way. Pe-Ce fibre, the polyvinyl product, is now used mainly for filters, ropes, cord, etc.

The electric tin-smelting plant of the Ceomines concern at Manono, Belgian Congo, is reported to have been considerably enlarged recently, so that a large proportion of the mineral coming from other Congo producers can be handled. The annual production capacity has been increased to 10,000 tons of tin, which will supplement the extra output now being arranged for in Cornwall and Nigeria.

Preprints received of the annual report for 1940 of the Smithsonian Institution, Washington, D.C., include a very interesting review, "The Rise of the Organic Chemical Industry in the U.S," by C. M. A. Stine, vice-president of Du Pont de Nemours and Co.; also, "The Rubber Industry, 1839-1939," by W. A. Gibbons, of the U.S. Rubber Co. Lyman J. Briggs, of the National Bureau of Standards, deals with "The National Standards of Measurement."

Argentina's entire output of tungsten for the next three years has been purchased by the Metals Reserve Company of Washington. It is hoped to intensify the working of certain deposits in order to increase the production from the 1940 level of 1250 tons up to 3000 tons per annum. The company, which acts as a war-time purchasing agent for the U.S.A. Government, carried out a similar deal with Peru (*see* THE CHEMICAL AGE for December 6).

To judge by its 82nd annual report, for the year ended June 30 last, the Cooper Union, of New York, has continued its educational work in chemical engineering with unexampled vigour and success. No doubt on account of the national defence programme, the chemical industry showed an increased demand for technically trained men, and graduates secured positions promptly. The chemical engineering laboratory was completed and important new equipment was installed.

Ammonium sulphate, trinitrotoluene, and gunpowder are to be made in a plant at Tjepoe, Netherlands East Indies, according to plans recently announced. N. V. Nederlandsch-Indische Chemische Fabrieken will be the first of the industrial enterprises to be established under the recently announced 10,000,000 guilder Government plan. This company was formed at Batavia in September last with a capital of 5,500,000 guilders, of which the Government holds 1,650,000 guilders.

Coinage of various countries has come into some prominence recently, owing to the shortage of nickel in certain quarters. According to Press reports, Holland's nickel stuivers are being withdrawn from circulation and replaced by zinc coins, as the Nazis urgently need nickel. From Eire comes the news that owing to the lack of nickel, the issue of 3d. and 6d. pieces with a bigger percentage of copper has been authorised. Even the famous "nickel," the U.S. 5-cent piece, is said to be threatened.

Forthcoming Events

The sixth meeting this session of the **Society of Chemical Industry (London Section)** will be held in the Rooms of the Chemical Society, Burlington House, Piccadilly, W.1, on **February 2,** at 2.15 p.m., when G. F. Lothian, M.A., F.Inst.P., will present a paper on "Fluorescence Measurement."

"Fluorescent Lighting" is the title of a paper to be delivered by Mr. H. G. Jenkins, of the research laboratories of the General Electric Co., Ltd., Wembley, at the **Royal Society of Arts,** John Adam Street, Adelphi, W.C.2., on **February 4,** at 1.45 p.m.

A meeting of the **Society of Public Analysts and Other Analytical Chemists** is to be held at 3.30 p.m., on **February 4,** at the Chemical Society's Rooms, Burlington House, Piccadilly, W.1, when among the four papers to be presented and discussed will be one by G. J. Austin, entitled, "Adsorption of Metals of the Iron Group in Analysis."

The Birmingham Paint, Varnish, and Lacquer Club will meet on the afternoon of **February 7,** at the Grand Hotel, Birmingham, to hear Mr. C. W. A. Mundy, A.I.C., speak on "Dehydrated Castor Oil—Fact and Fiction."

Professor D. M. Newitt will lecture on "High Pressure Reactions and Technique" before the Leeds Area Section of the **Institute of Chemistry** on **February 9,** at 6.30 p.m., in the Chemistry Theatre, Leeds, College of Technology.

Chemical and Allied Stocks and Shares

AT the beginning of the week subdued and inactive conditions ruled in the stock and share markets, sentiment being influenced mainly by the trend of the Far Eastern war news. Later, however, the Prime Minister's speech was a helpful influence, and security values were inclined to improve. British Funds again had a very steady undertone, good revenue figures being a favourable influence.

Among shares of chemical and kindred companies, Borax Consolidated deferred were a steady feature, having remained at 30s. 6d. awaiting the forthcoming financial results. At one time demand was in evidence for British Drug Houses ordinary shares, which transferred around 26s. B. Laporte were again 63s. 9d., while in Fison Packard ordinary, business up to 38s. 9d. was recorded. At 33s. Imperial Chemical were within 3d. of the price ruling a week ago, and the 7 per cent. preference units were unchanged on balance at 35s. The I.C.I. final dividend announcement is expected at the end of March or early in April. Hopes that the dividend may be better than the 5 per cent. paid for the previous year maintained steadiness in Lever and Unilever, which were little changed at around 30s. Moderate fluctuations continued to be shown in United Molasses, which at 32s. were slightly higher on balance. The units of the Distillers Co. were 74s. 9d., compared with 75s. 3d. a week ago. In other directions, demand was in evidence for Turner and Newall ordinary which moved up further from 70s. 6d. to 71s. 10½d., but later reacted to 71s. 3d. Hopes that the dividend may be maintained were reflected by firmness in British Oxygen ordinary at 68s.

Activity was again shown in British Plaster Board, which, however, remained around 22s., while at 45s. 3d British Aluminium were within 3d. of the price current a week ago. General Refractories were slightly higher at 10s. 1½d., and Imperial Smelting were again 10s. 9d. Nairn and Greenwich remained at 57s. 6d., and Barry and Staines were 33s. 6d., while Wall Paper Manufacturers deferred were slightly higher at 26s. 9d. A better tendency appeared in Associated Cement at 43s. 1½d., and a steady feature was again provided by British Match at 34s. 6d. A number of paint shares have been inclined to improve in advance of the financial results due in March. International Paint were higher at 95s. Triplex Glass 10s. shares have been steady around 32s., and remained firmly held, the market having continued to be hopeful that a better dividend than last year's 10 per cent. may be in prospect.

Only small movements have been shown among iron and steel securities; Tube Investments were 85s. 9d.; Stewarts and Lloyds, 46s. 3d.; Dorman Long, 20s. 3d.; and Staveley ordinary, 45s. 3d. Textile issues, such as Bradford Dyers and Calico Printers, came in for a further moderate amount of profit-taking following their recent strong rise. Courtaulds were slightly lower at 34s. 6d.; not more than the maintenance of the dividend is generally expected to be shown by the results due in March. Boots Drug have been steady at 36s. 6d., while Beechams Pills deferred were 10s. 3d., Sangers 17s. 6d., and Timothy Whites 19s. 10½d. Monsanto Chemicals 5½ per cent. preference remained at 22s. 6d. Business in the shares of the Valor Co. was recorded at 31s. 3d.; the financial results fall to be issued in a few weeks. Cerebos ordinary continued to be very firmly held and were quoted at £9⅛, which reflects the strength of the balance sheet position and market hopes that the dividend may be maintained. Erinoid 5s. ordinary remained around 8s., and elsewhere British Industrial Plastics 2s. shares have been around 3s. 6d., following publication of the annual results. Oil shares developed a better tendency following an earlier further decline.

British Chemical Prices

Market Reports

A STEADY flow of contract deliveries to the consuming industries is reported from the heavy chemicals section of the market and the movement of chemicals generally during the past week has been on a fairly substantial scale. There have not been any important price alterations and quotations which are mostly on a strong basis, have kept within narrow limits. The demand for the potash and soda products remains steady with supplies in many cases insufficient to meet spot requirements. Steady buying is reported from the acid products section where quotations display a firm undertone. Elsewhere trading conditions remain unchanged with quotations well held. In the coal tar products section price movements have been few, and the volume of business about average for the period. Carbolic acid crystals are in active request and fair interest is shown in solvent and heavy naphthas. In regard to the control of cresylic acid a conference of interests concerned was held at Leeds last week and the market conditions remain uncertain pending an announcement.

MANCHESTER.—Prices in most sections of the Manchester chemical market during the past week have been on a firm basis. A moderate volume of fresh inquiry has been circulating and sellers have reported further additions to order books in the alkalis and in a wide range of miscellaneous chemicals, while contract delivery specifications have been coming in steadily from the cotton and woollen textile and allied trades, among other leading outlets. Among the tar products the xylols and naphthas are easier and somewhat less active, but in other directions values have been maintained.

GLASGOW.—In the Scottish heavy chemical trade business has been very quiet during the past week, both for the home market and for export. Prices remain extremely firm.

Price Changes

Aluminium Sulphate.—£10 5s. per ton, d/d.

Ammonium Carbonate.—£37 10s. per ton d/d in 5 cwt. casks.

Antimony Oxide.—£111 to £117 per ton, 1/5 tons, d/d net.

Arsenic.—99/100%, £33 10s. per ton, ex store.

Benzol.—Industrial (containing less than 2% of toluol), 2s. 4d. per gal., ex works.

Bleaching Powder.—Spot, 35/37%, £10 17s. 6d. per ton, in casks; special terms for contract.

Carbolic Acid.—Crystals, 9½d. to 11½d. per lb.; crude, 60's, 3s. 9d. to 4s. 6d., according to specification.

Formaldehyde.—£24 5s. to £25 10s. per ton in casks d/d.; imported material dearer.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Lead Acetate.—White, £50 ton lots.

Litharge.—1 to 2 tons £44 per ton.

Magnesium Chloride.—Solid (ex wharf), £12 to £16 per ton.

Magnesium Sulphate.—Commercial, £12 to £14 per ton, according to quality, ex works.

Naphtha.—MANCHESTER: 90/160, 2s. 5d. to 2s. 10d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works, according to quantity.

Sodium Bisulphite Powder.—60/62%, £17 10s. per ton d/d in 2-ton lots for home trade.

Sodium Hyposulphite.—Pea crystals, £20 per ton for 2-ton lots; commercial, £14 15s. per ton.

Sodium Nitrite.—£21 to £23 per ton for ton lots.

Sodium Prussiate.—7½d. to 8½d. per lb., ex store.

Sodium Silicate.—£6 to £10 per ton, according to quality.

Sodium Sulphide.—Solid, 60/62%. Spot £17 15s. per ton d/d in drums; crystals, 30/32%, £12 7s. 6d. per ton d/d in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, spot, £19 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Xylol.—MANCHESTER: 3s. 1d. to 3s. 6d. per gal.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

J. W. CHAFER, LTD., Doncaster, chemical manufacturers and spraying specialists (M., 31/1/42.) January 7, £2,400 mort. (sec. 81, 1929 Act), to Miss E. M. Littlewood, Scarborough; charged on property at Doncaster.

Receivers Ceasing to Act

ADPREG, LTD., Newcastle-on-Tyne, glue manufacturers. (R.C.A., 31/1/42.) T. P. Parmeter. December 20.

Application for Discharge

BEUGGER, KNUD JOHN ALWIN, chemical engineer, The Red House, Loom Lane, Radlett, Herts. (A.F.D., 31/1/42.) Court, St. Albans. Hearing, March 17, 10.30 a.m., The Court House, Town Hall, St. Albans.

Company News

British Industrial Plastics, Ltd., have announced profit, after taxation, of £15,989 (£27,182), and have declared a dividend of 6 per cent. (8 per cent.).

Thompson Brothers (Bilston), Ltd., have declared a dividend of 3 per cent., tax free, on the 6 per cent. cumulative preference shares, for the six months to July 31, 1942.

Universal Asbestos Manufacturing Co., Ltd., announce a dividend on the 6 per cent. redeemable cumulative preference shares for period September 2, 1941, to March 1, 1942.

The directors of **Benn Brothers Limited,** proprietors of THE CHEMICAL AGE, have declared the following dividends, less tax, for the half-year ended December 31, payable on February 14: 3 per cent. on preference shares and interim dividend of 4 per cent. on ordinary shares (same).

Redfern's Rubber Works, Ltd., announce a net profit for 1941 of £45,834 (£41,687), and have declared final dividends as follows: 3¾ per cent. on the A and B preference shares, making 7½ per cent. (same); 6¾ per cent. on ordinary shares, making 10 per cent. (same).

The chairman of **William Neill and Son (St. Helens), Ltd.,** details of whose dividends were given in this column on January 10, announced a trading profit for 1941 of approximately £74,000, and forecast a possible increase in the capital of the company, stating that it was quite impossible, under present-day taxation, for the company to develop and consolidate its position out of income, as in the past.

New Companies Registered

M. & P. Colloid Stabilizers, Ltd. (371,918). Private company. Capital: £500 in 500 shares of £1 each. Producers, manufacturers, buyers and sellers of colloidal products of any kind, manufacturers, exporters, importers and dealers in goods, wares and merchandise, etc. Directors: J. May; L. E. Parsons. Registered office: 6 Bishopsgate, London, E.C.2.

The current issue of *The Welder*, published by MUREX WELDING PROCESSES, LTD., Waltham Cross, Herts, ably maintains the high standard associated with the publication. Under the heading "Welding Commentary" is the first of a series of articles briefly dealing with applications of welding which otherwise might escape attention.

The Murex system of weld dimensioning has been designed to fill the gap caused by the fact that there is no standard code of symbols in use in Britain for representing, in detail drawings, the full particulars of each component part in a welded construction. The system is explained in a booklet, which is fully illustrated and has numerous references.

PRECAUTIONS AGAINST RADIUM POISONING

Radium poisoning caused a large number of deaths among the 2000 women workers employed in the United States during the last war in the radioactive dial industry. The revival of the industry with the demand for instrument panels, chronometers, etc., has brought into operation the safety regulations designed by the New York State Labour Department. Present safeguards include exhaust ventilation, use of leaded tables and containers, ultra-violet lamps to detect radium deposits on workers' hands or clothing, careful supervision of health, and adequate sanitation in plant processes.

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WORKING NOTICES

THE proprietor of British patent No. 401,484 is prepared to license British manufacturers to work thereunder. It relates to the fractional distillation of volatile liquids and to processes for contacting immiscible fluids of different densities. Address, Boult, Wade and Tennant, 112 Hatton Garden, London, E.C.1.

THE Proprietors of Patent No. 501,233 for "Improvements in or relating to Processes for the Manufacture of Aluminium or Aluminium Alloys" are desirous of negotiating with interested parties with a view to promoting the full commercial development of this invention in the United Kingdom by way of the grant of licences or otherwise on reasonable terms. Please address communications to Blackburn & Pollett, 12 Vernon Walk, Tadworth, Surrey.

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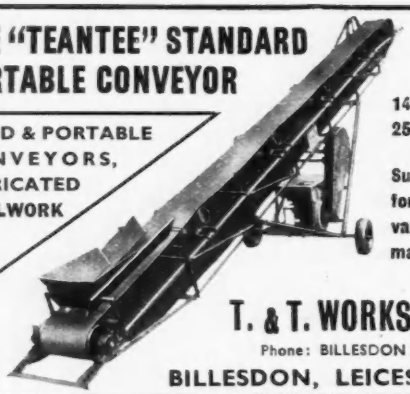

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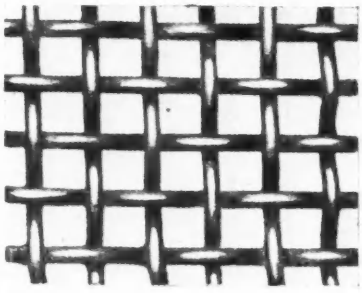

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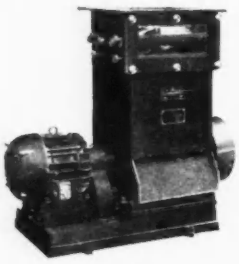

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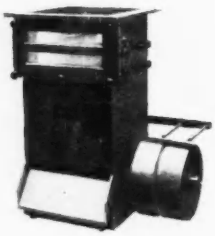

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